

Reciprocating Liquid Chillers 60-Hertz

These diagrams apply to 30HR,HS070-120 Model A units starting with Serial No. F155985 and ending with Serial No. G448588.

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UNIT 30HR,HS	FIGURE NUMBER	DESCRIPTION	VOLTS	UNIT LABEL DIAGRAM	
				30HR	Rev
070 thru 120	1	Wiring For Part-Winding Start	All	-	-
	2	Suggested Field Wiring Interlocks	All	All	Same As Below
070, 080, 090	3	Locations of Control Components			
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100, 110, 120	6	Control Circuit (Simplified Schematic)			
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GENERAL NOTES

- Factory wiring is in accordance with the National Electrical Code. Any field modifications or additions must be in compliance with all applicable codes. Field-installed power wires must be rated 75 C minimum.
- Control circuit is 115-1-60, with 10-amp circuit breaker.
- Oil pressure safety switches are standard on 30HS units only. Jumpers between terminals **1** and **2** and between **3** and **4** are supplied on 30HR units.
- Manual transfer switch provides the following starting sequences:
 Three-compressor units — position 1 (terminal A), 3-2-1; position 2 (terminal B), 1-2-3.
 Four-compressor units — position 1 (terminal A), 1-4-3-2; position 2 (terminal B), 3-2-1-4.
Stop unit before changing transfer switch position.
- All field-supplied auxiliary contacts must have a minimum rating of 1250-va inrush and 430-va sealed plus capacity required for field-installed equipment between terminals **11** and **12**, **10** and **7**, **5** and **8**, **9** and **8**.
- With accessory .75-kva control transformer, additional controls up to 3800-va inrush and 175-va sealed may be used.
- When using a transformer, ground control circuit by connecting green wire from transformer terminal X2 to ground screw (detailed instructions with transformer package).
- When using field-supplied 115-volt control power, terminal **24** (L2) must be connected to neutral or ground potential.
- Across-the-line starting is standard on all units. If it is necessary to modify to part-winding start, refer to "Modification For Part-Winding Start."

SEQUENCE OF OPERATION

The 115-1-60 control power can be supplied directly from a separate source thru a code-approved fused disconnect or thru a field-installed accessory transformer with the primary side connected to the unit power terminal block. A double-pole circuit breaker protects the control circuit and serves as the control circuit switch. Crankcase heaters are wired in the control circuit ahead of the START switch, so they are always operative as long as the control circuit breaker is closed. Heaters are wired so they are on only when their respective compressors are cycled off.

WARNING: The control circuit power must never be off except when unit is being serviced.

After a prolonged shutdown of 8 hours or more, the crankcase heaters should be on for 24 hours before starting the unit.

When power is supplied to the control circuit and the control circuit breaker is closed, the unit is ready for operation, providing all safety devices are satisfied, interlocks are closed, and instructions on warning labels have been followed.

When the START button on the control panel is pressed, a red indicating light on the control panel comes on and the step controller and control relays 1 thru 4 are energized. After a maximum of 1.5 minutes, the recycle relay is energized and the step controller cycles back (in the load direction) to the correct cam position to begin the compressor starting sequence. The compressors start one at a time at brief intervals until the load requirement is satisfied. After completing the starting sequence, the controller stops and starts, unloads and loads the compressors to maintain capacity control in response to water temperature controller demand. Factory cam settings on the step controller protect the compressors against rapid recycling.

Complete Unit Stoppage can be caused by any of the following conditions: general power failure, blown fuse in control power feed disconnect, open control circuit breaker, STOP button depressed, open contacts in low water temperature cutout, open contacts in any auxiliary interlock between terminals [11] and [12].

Single-Circuit Stoppage can be caused by open contacts in any motor thermal protector, open contacts in low-pressure switch, open contacts in high-pressure switch, open contacts in oil safety switch (when used), blown compressor circuit fuse.

Stoppage of one circuit by safety device action does not affect the other circuit. Besides stopping compressors, all the devices listed *except the low-pressure switch* will close the liquid line solenoid valve for that circuit.

CAUTION: If unit or single circuit stops more than once as a result of any of the above safety devices, the cause should be determined and corrected before attempting another restart.

Restart Procedure (after cause for stoppage is corrected).

GENERAL POWER FAILURE – Press START button on control panel.

BLOWN FUSE IN POWER FEED DISCONNECT – Replace fuse and press START button on control panel.

LOW WATER TEMPERATURE CUTOOUT – Press reset button on control (inside control box). Restart is automatic.

AUXILIARY INTERLOCK – Automatic restart after condition is corrected.

OPEN CONTROL CIRCUIT BREAKER – Close breaker and press START button on control panel.

HIGH-PRESSURE SWITCH – Press START button on control panel.

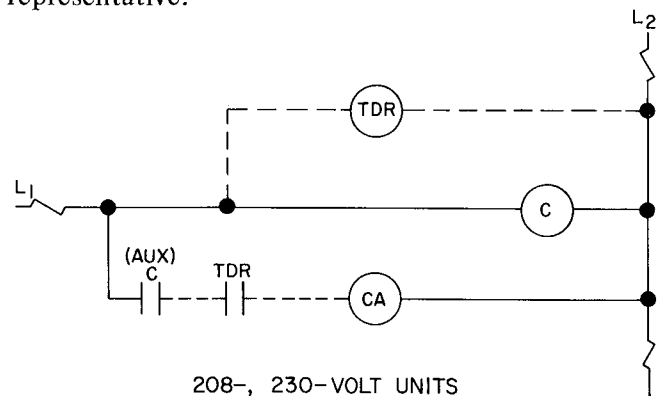
LOW-PRESSURE SWITCH – Compressors will restart automatically when pressure comes up sufficiently.

COMPRESSOR MOTOR THERMAL PROTECTOR – After motor has cooled down, press START button on control panel.

OIL SAFETY SWITCH – Press reset button on the switch, and press START button on control panel.

MODIFICATION FOR PART-WINDING START (See Fig. 1, 5 and 6.)

For 208-, 230-Volt Units – In the control circuit for each compressor, add a 1.5 second time-delay relay to actuate the second contactor coil (CA). Time-delay relay, Carrier part number HN67FK001, is available from Carrier Service Parts Center, Syracuse, N.Y. Contact your local Carrier representative.



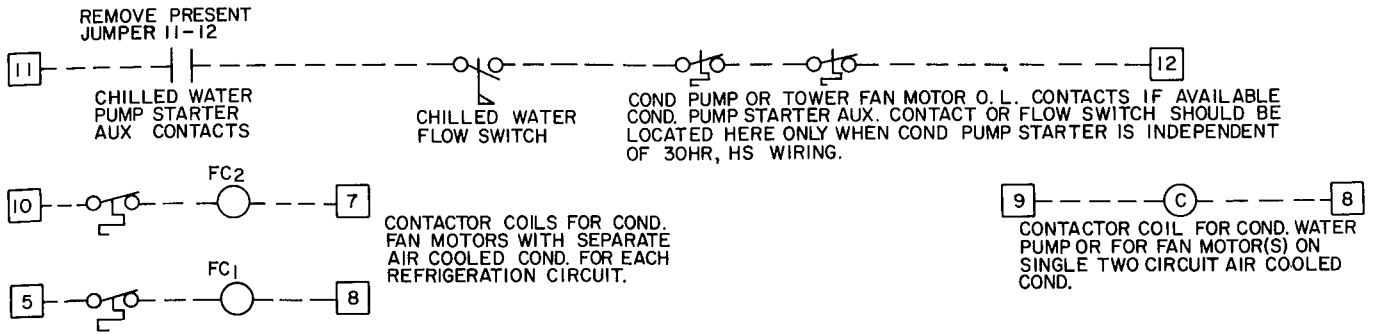
208-, 230-VOLT UNITS

LEGEND

AUX. – Auxiliary Contacts
 C – Compressor Contactor
 CA – Second Compressor Contactor
 TDR – Time-Delay Relay

○ Holding Coil
 — Factory Wiring
 - - - Field Wiring

Fig. 1 – Control Wiring for Part-Winding Start

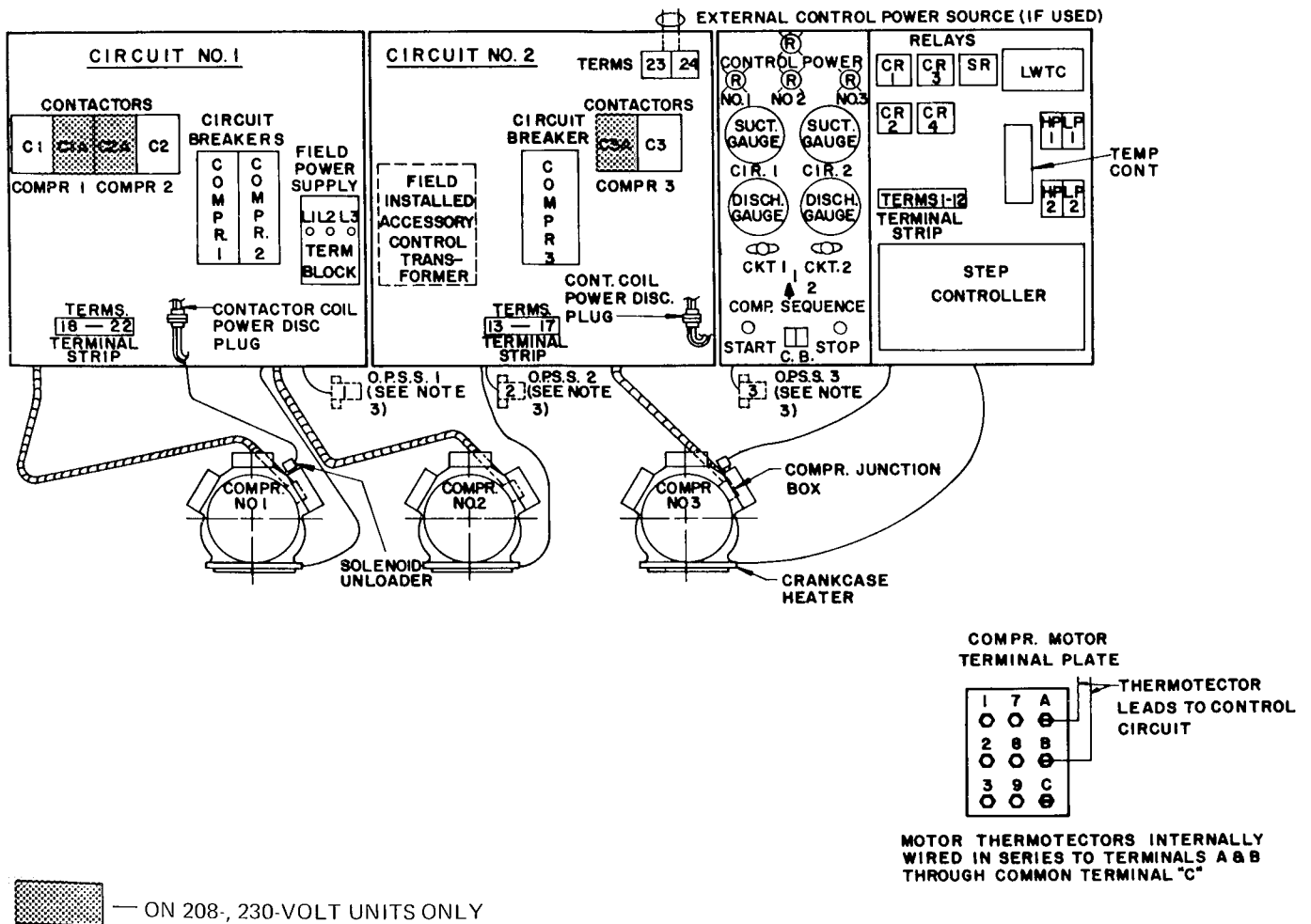


(SEE NOTES 5 AND 6)

Fig. 2 — Suggested Field Wiring of Interlocks

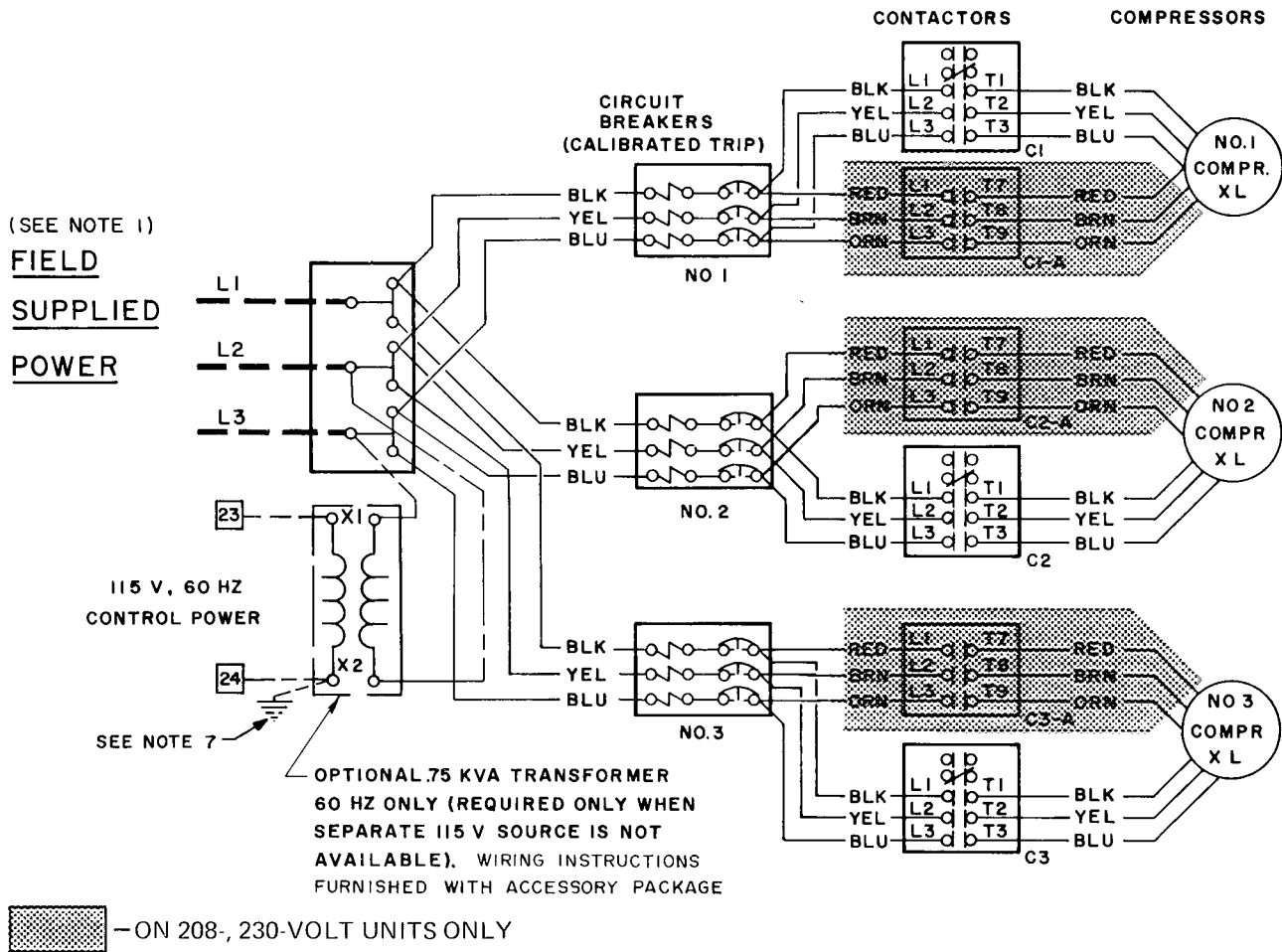
LEGEND (For Fig. 3 thru 8)

- | | | |
|-----------------------------------|--|--|
| BR — Balancing Relay | S — Step Controller Switch | △ Terminals on Temp Controller |
| C — Compr Contactor | SR — Starting Relay | □ Terminals on Terminal Strips |
| CA — Second Contactor | TS — Transfer Switch (Compr Starting Sequence) | ⬡ Terminals on Compr |
| CB — Control Circuit Breaker | U — Unloader (Compr) | — Factory Wiring |
| CR — Control Relay | XL — Across-the-Line | - - - Factory Wiring on 30HS Units Only |
| HP — High Pressurestat | | · · · · · Field Wiring |
| LLS — Liquid Line Solenoid Valve | ○ Coil | — · — · — Factory Wired, Field Connected |
| LP — Low Pressurestat | ⊙ Light (Red) | |
| LS — Limit Switch | ◇ Terminals on Step Controller | |
| LWTC — Low Water Temp Cutout | | |
| OPSS — Oil Pressure Safety Switch | | |
| RR — Recycle Relay | | |



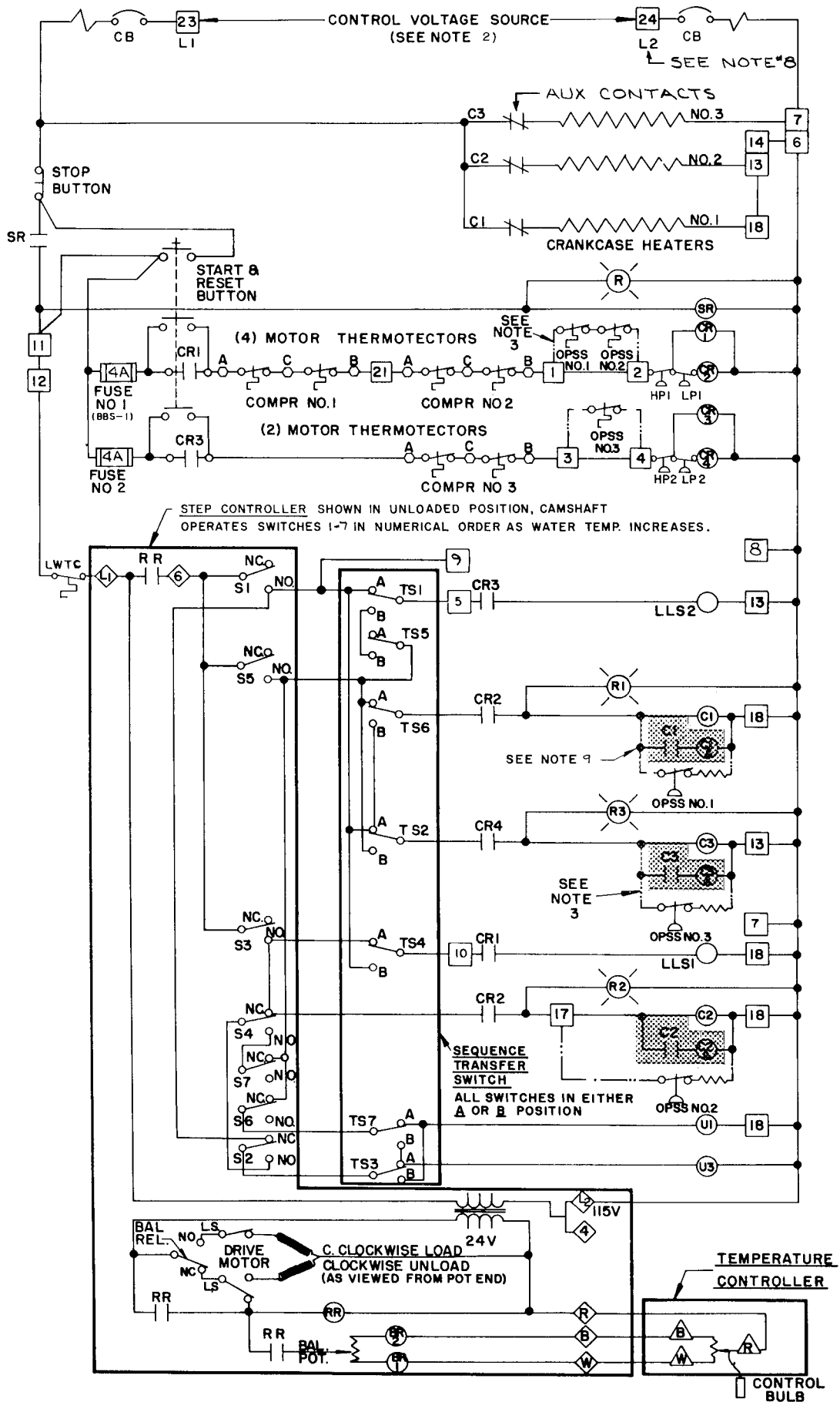
30HR, HS070, 080, 090

Fig. 3 — Locations of Control Components (All Voltages)



30HR, HS070, 080, 090

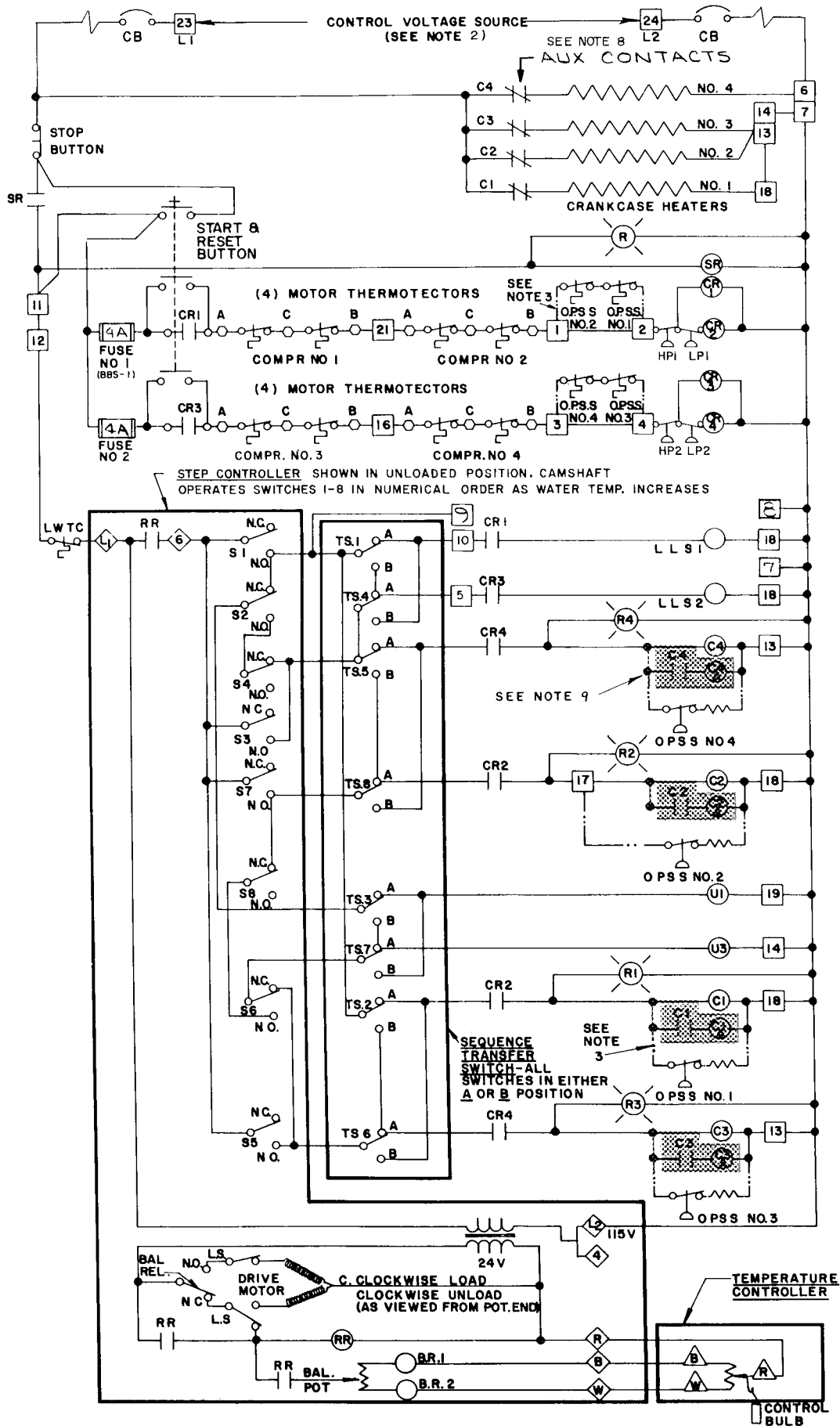
Fig. 4 – Power Schematic (All Voltages)



— ON 208-, 230-VOLT UNITS ONLY

30HR, HS070, 080, 090

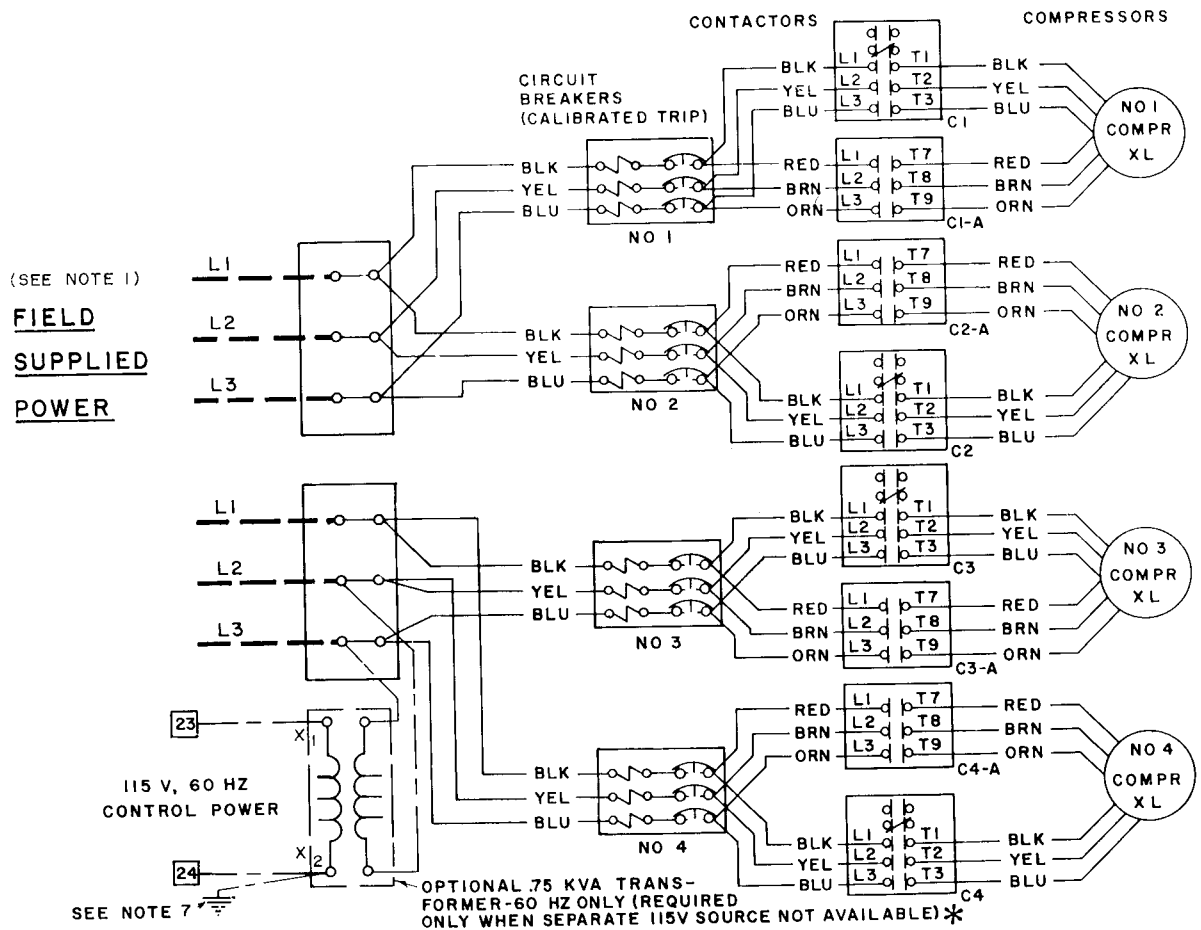
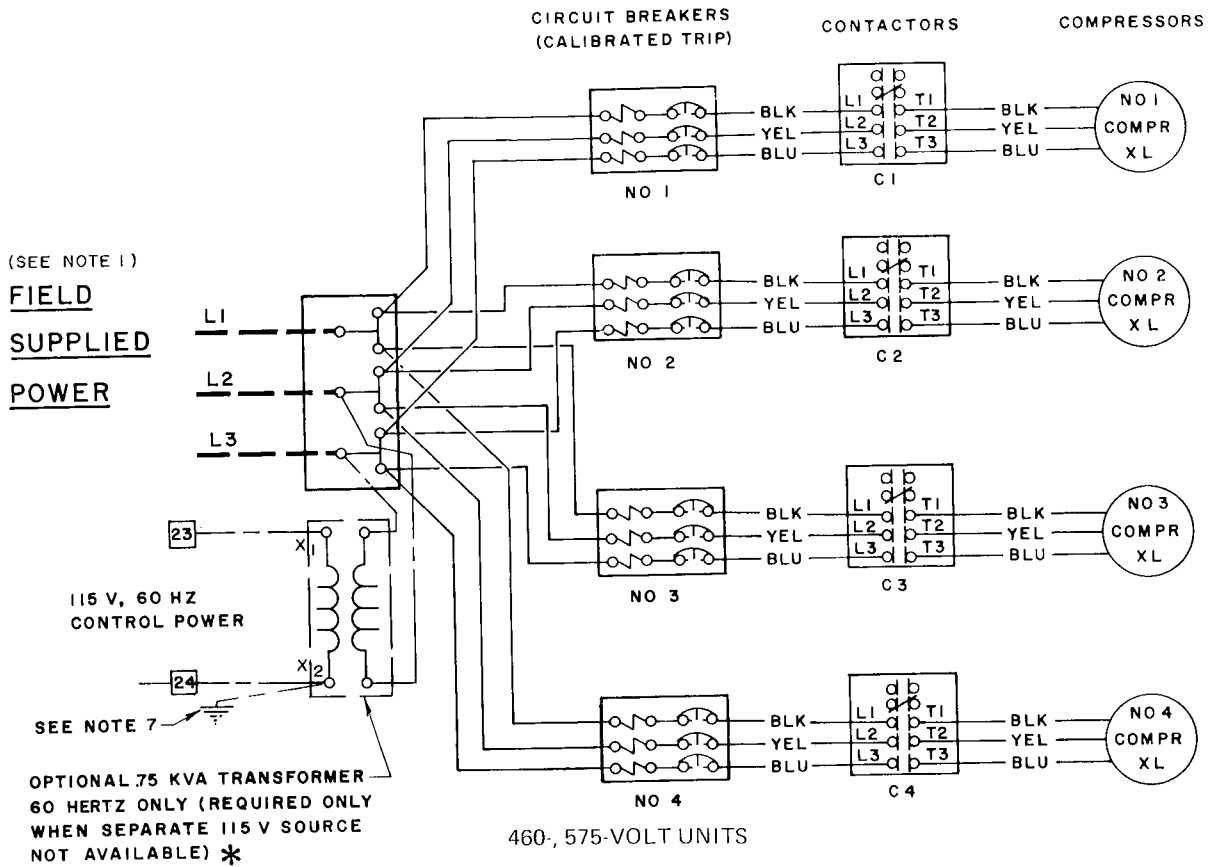
Fig. 5 – Control Circuit Schematic (All Voltages)



—ON 208-, 230-VOLT UNITS ONLY

30HR, HS100, 110, 120

Fig. 6 - Control Circuit Schematic (All Voltages)

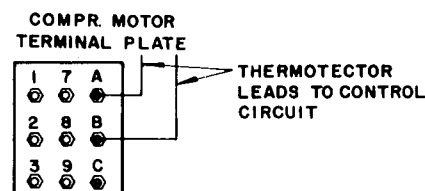
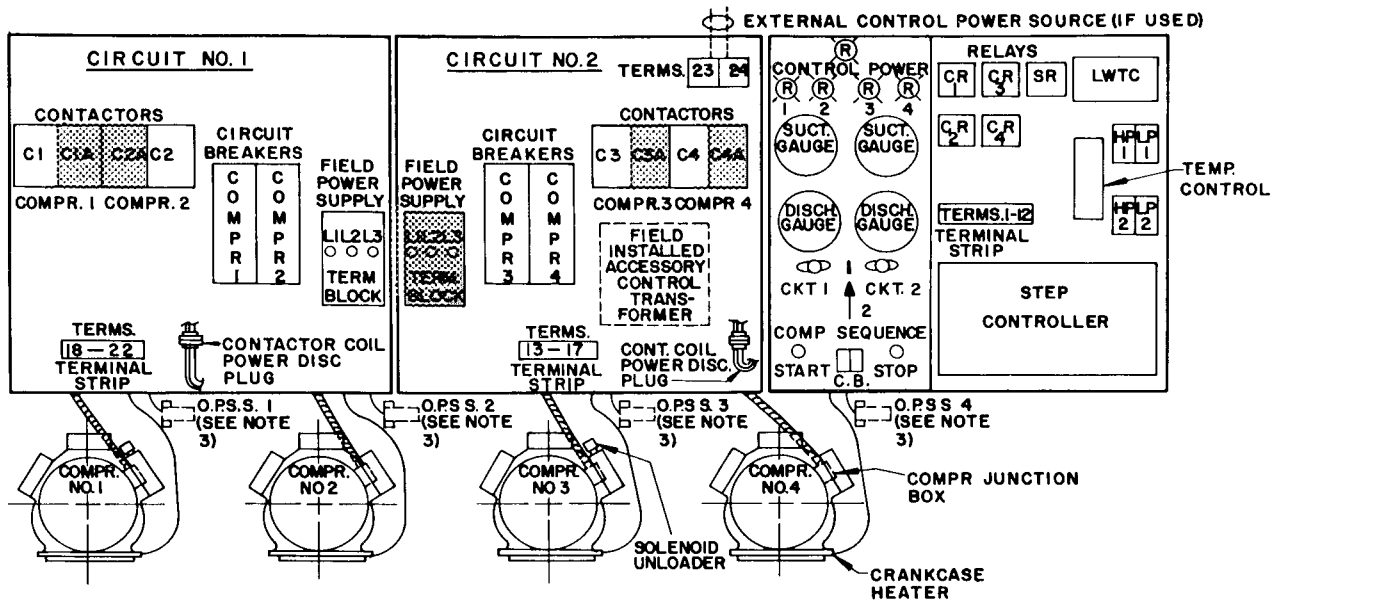


* TRANSFORMER WIRING INSTRUCTIONS FURNISHED WITH ACCESSORY PACKAGE


208-, 230- VOLT UNITS

30HR, HS100, 110, 120

Fig. 7 - Power Schematics (All Voltages)



MOTOR THERMOTECTORS INTERNALLY WIRED IN SERIES TO TERMINALS A & B THROUGH COMMON TERMINAL "C"

 — ON 208-, 230-VOLT UNITS ONLY

30HR, HS100, 110, 120

Fig. 8 — Locations of Control Components (All Voltages)

For replacement items use Carrier Specified Parts.

Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.